Alternative	Overall Protection of Human	Compliance with ARARs	Long Term Effectiveness and Permanence	Reduction of Toxicity, Mobility,	Short Term Effectiveness	Implementability	Co	ost
	Health and the Environment			and Volume through Treatment			DMM Scenario A	DMM Scenario B
Alternative 1: Removal of Fine Grained Sediment from Area of Focus			Cancer risks reduced to $5x10^{-4}$ for ingestion of fish and $4x10^{-4}$ for ingestion of crab. For fish ingestion, HI for adult reduced to 4.7 and child to 22. For crab ingestion, HI for adult reduced to 3.5 and child to 19. Mink HI reduced to 6. Heron HI	Removal of 11 million cy of contaminated sediment would permanently reduce volume of contaminants in Area of Focus. Thermal treatment of 1.7 million cy would irreversibly destroy contaminants.	Greatest amount of removal results in greatest potential for disturbance and environmental impact.	Implementable. Slight decrease in flooding. No change in authorized depth required.	\$2.0 Billion	\$2.3 Billion
Alternative 2: Engineered Capping of Area of Focus			reduced to 2.  Alternative 1 relies exclusively on placement of a backfill layer to provide a measure of control in the event that residual contamination poses health risks. This alternative does not include an engineered cap, because the intent is for the	Removal of 1.2 million cy of contaminated sediment would permanently reduce volume of contaminants in Area of Focus. Thermal treatment of 1.2 million cy would irreversibly destroy contaminants.	Lowest amount of removal results in lowest potential for disturbance and environmental impact.	Considerable increase in flooding. Change in authorized depth required.	\$0.9 Billion	\$1.1 Billion
Alternative 3: Engineered Capping of Area of Focus Following Reconstruction of Federally Authorized Navigation Channel	Protective. Human health risks are reduced to the risk range. Substantial ecological improvements occur in a substantially shorter period of time. Institutional controls will be processery to protect human.	Alternative 1 through 6 will be designed and carried out in accordance with applicable ARARs and accepted best management practices.	contaminated fine-grained sediment to be removed with the assumption that the underlying less-contaminated sand material will not erode to any significant extent. The backfill layer is not intended to be maintained, in contrast to the engineered cap in Alternative 2 whose thickness must be maintained in the long term in order to ensure protectiveness of contaminant inventory left	Removal of 7.1 million cy of contaminated sediment would permanently reduce volume of contaminants in Area of Focus. Thermal treatment of 1.7 million cy would irreversibly destroy contaminants.	Relatively moderate amount of removal results in moderate potential for disturbance and environmental impact.	Implementable. Slight decrease in flooding. No change in authorized depth required.	\$1.5 Billion	\$1.9 Billion
Alternative 4: Engineered Capping of Area of Focus Following Construction of Navigation Channel to Accommodate Current Usage	be necessary to protect human health after remedy is implemented, during period of monitored natural recovery. Control of sources above Dundee Dam will accelerate time to reach risk range.	practices.	underneath.  Alternatives 3, 4, 5, and 6 rely on varying combinations of backfill and engineered cap, depending on the amount of contaminated inventory left after dredging. Of these four alternatives, Alternative 3 proposes removing the	Removal of 3.2 million cy of contaminated sediment would permanently reduce volume of contaminants in Area of Focus. Thermal treatment of 1.7 million cy would irreversibly destroy contaminants.	Relatively lower amount of removal results in relatively lower potential for disturbance and environmental impact.	Considerable increase in flooding. Change in authorized depth required.	\$1.3 Billion	\$1.6 Billion
Alternative 5: Engineered Capping of Area of Focus Following Construction of Navigation Channel for Future Use			most fine-grained sediment down to the underlying sandy layer, while Alternative 4 proposes leaving behind the most contaminant inventory, so that Alternative 3 relies most heavily on backfill and Alternative 4 relies most on engineered capping.  The reliability of both dredging and engineered	Removal of 6.3 million cy of contaminated sediment would permanently reduce volume of contaminants in Area of Focus. Thermal treatment of 1.7 million cy would irreversibly destroy contaminants.	Relatively moderate amount of removal results in moderate potential for disturbance and environmental impact.	Implementable. Slight decrease in flooding. Change in authorized depth required.	\$1.4 Billion	\$1.8 Billion
Alternative 6: Engineered Capping of Area of Focus Following Construction of Navigation Channel for Future Use and Removal of Fine Grained Sediment from Primary Inventory Zone and Primary Erosional Zone			caps depends upon proper design and implementation, while the reliability of capping also depends on the consistency and sufficiency of future maintenance.	Removal of 7.2 million cy of contaminated sediment would permanently reduce volume of contaminants in Area of Focus. Thermal treatment of 1.7 million cy would irreversibly destroy contaminants.	Relatively moderate amount of removal results in moderate potential for disturbance and environmental impact.	Implementable. Slight decrease in flooding. Change in authorized depth required.	\$1.5 Billion	\$1.8 Billion

Table 2-22: Summary of Quantitative Estimates for Six Remedial Alternatives

Alternatives	Navigation Usage	Flooding <sup>(2)</sup>	Dredging Volume	Construction	Total Present Worth Cost	
	Navigation channel depths <sup>(1)</sup>	(additional flooding)	(millions of cubic yards)	Duration (years)	DMM Scenario A	DMM Scenario B
Alternative 1: Removal of Fine-Grained Sediment from Area of Focus	Authorized channel dimensions accommodated (see Alternative 3 below).	Decrease (not estimated)	11.0	12	\$2.0 Billion	\$2.3 Billion
Alternative 2: Engineered Capping of Area of Focus	Navigation significantly reduced.	Considerable Increase (93 acres)	1.1	6	\$0.9 Billion	\$1.1 Billion
Alternative 3: Engineered Capping of Area of Focus Following Reconstruction of Federally Authorized Navigation Channel	Authorized channel dimensions accommodated.  • 30' from RM0 to RM2.5  • 20' from RM2.5 to RM4.6  • 16' from RM4.6 to RM8.1  • 10' above RM8.1	Decrease (not estimated)	7.0	8	\$1.5 Billion	\$1.9 Billion
Alternative 4: Engineered Capping of Area of Focus Following Construction of Navigation Channel to Accommodate Current Usage	Current navigation usage accommodated.  30' from RM0 to RM1.2  16' from RM1.2 to RM2.5  Navigation above RM2.5 significantly reduced	Considerable Increase (24 acres)	4.4	6	\$1.3 Billion	\$1.6 Billion
Alternative 5: Engineered Capping of Area of Focus Following Construction of Navigation Channel for Future Use	Anticipated future navigation usage accommodated.  • 30' from RM0 to RM1.2	Decrease (-17 acres)	6.1	7	\$1.4 Billion	\$1.8 Billion
Alternative 6: Engineered Capping of Area of Focus Following Construction of Navigation Channel for Future Use and Removal of Fine Grained Sediment from Primary Inventory Zone and Primary Erosional Zone	<ul><li>16' from RM1.2 to RM3.6</li><li>10' above RM3.6</li></ul>	Decrease (not estimated)	7.0	8	\$1.5 Billion	\$1.8 Billion

## Notes:

- (1) Navigation channel depths are provided in feet below mean low water.(2) Flood estimates are provided for the 100-year return interval river flow event.

Table 2-23a: ARARs for Pre-Construction

ARAR	Citation(s)	Rationale	Action Specific/ Location Specific
Hazardous Material Transportation Act	49 U.S.C. §§ 5101 et seq.	<ul> <li>Covers transportation of any hazardous wastes.</li> <li>EPA will make the determination on whether or not the dredged sediments qualify as hazardous waste.</li> </ul>	Action Specific
Resource Conservation and Recovery Act (RCRA)	40 C.F.R. §§ 239 - 299	<ul> <li>Covers transportation and disposal of hazardous wastes.</li> <li>EPA will make the determination on whether or not the dredged sediments qualify as hazardous waste.</li> </ul>	Action Specific
Toxic Substances Control Act (TSCA)	15 U.S.C. §§ 2601 et seq.	<ul> <li>Governs transportation, handling and storage of PCB-contaminated waste with concentrations greater than 50 ppm.</li> <li>Thus far, chemical analysis of river sediments has not exhibited samples above the TSCA limit. However, if the results of the preconstruction sampling effort show concentrations over the limit, TSCA may apply.</li> </ul>	Action Specific
New Jersey Freshwater Wetlands Protection Act Rules	N.J.A.C. 7:7A	Delineation of existing wetlands will be required during the pre-design phase. Dredging activities may impact these wetlands requiring mitigation.	Location Specific

Table 2-23b: ARARs for Construction and Operation of Support Area

ARAR	Citation(s)	Rationale	Action Specific/ Location Specific
Clean Air Act	42 U.S.C. §§ 7401 et seq.	Covers emissions from equipment.	Action Specific
Endangered Species Act	16 U.S.C. §§ 1531-1544	Survey will be required during design phase to identify any endangered or threatened species or their habitats in the areas impacted by construction or operation of a support area.	Location Specific
Hazardous Material Transportation Act	49 U.S.C. §§ 5101 et seq.	<ul> <li>Covers transportation of any hazardous wastes</li> <li>Applies to the transportation of hazardous wastes generated during facility operations (e.g., waste oils, lubricants, etc.)</li> </ul>	Action Specific
Resource Conservation and Recovery Act (RCRA)	40 C.F.R. §§ 239 - 299	Covers disposal of operational wastes, oils, etc.	Action Specific
Rivers and Harbors Act	33 U.S.C. §§ 401 et seq.	Applies to barge movement and anchoring.	Location Specific
Federal and State Historic Preservation Acts	16 U.S.C. § 470; N.J.S.A. 13:1B	Survey will be required during design phase to identify any historic properties or cultural resources which may be impacted by construction or operation of a support area.	Location Specific
New Jersey Coastal Zone Management Rules	N.J.A.C. 7:7E	Covers construction of bulkhead, buildings, docks, launches, etc.	Location Specific
New Jersey Freshwater Wetlands Protection Act Rules	N.J.A.C. 7:7A	<ul> <li>Delineation of any existing wetlands will be required during the design phase.</li> <li>Construction and operation activities may impact nearby wetlands areas.</li> </ul>	Location Specific
New Jersey Soil Erosion and Sediment Control Act	N.J.S.A. 4:24-39 to 55	Requires the development of a sediment control plan for any development or construction activities.	Location Specific
New Jersey Stormwater Management Rules	N.J.A.C. 7:8	<ul> <li>Covers activities which affect erosion, groundwater recharge, or runoff quantity and quality.</li> <li>Applies to construction activities, paving, removal of vegetation, etc.</li> </ul>	Action Specific

Table 2-23c: ARARs for Dredging

ARAR	Citation(s)	Rationale	Action Specific/ Location Specific
Clean Air Act	42 U.S.C. §§ 7401 et seq.	<ul> <li>Covers emissions from equipment and from dredged material.</li> </ul>	Action Specific
Clean Water Act (CWA)	33 U.S.C. §§ 1251 et seq.	• For discharge of water (section 401) and discharge of dredged material (section 404).	Action Specific
Endangered Species Act	16 U.S.C. §§ 1531- 1544	• Survey will be required during design phase to identify endangered or threatened species or their habitats in the areas impacted by dredging operations.	Action Specific
Resource Conservation and Recovery Act (RCRA)	40 C.F.R. §§ 239 - 299	<ul> <li>Covers transportation and disposal of hazardous wastes.</li> <li>EPA will need to make the determination on whether or not the dredged sediments qualify as hazardous waste.</li> </ul>	Action Specific
Rivers and Harbors Act	33 U.S.C. §§ 401 et seq.	<ul> <li>Applies to barge movement and anchoring.</li> <li>Covers sheet pile installation for protection of bulkheads, bridges, docks, and utilities.</li> </ul>	Location Specific
Federal and State Historic Preservation Acts	16 U.S.C. § 470; N.J.S.A. 13:1B	• Survey will be required during design phase to identify historic properties or cultural resources which may be impacted by dredging operations.	Location Specific
New Jersey Coastal Zone Management Rules	N.J.A.C. 7:7E	<ul> <li>Makes limitations on depth of cut, side slopes, and operational practices (BMPs).</li> <li>Requires protection of bulkheads, bridges, piers, docks and utilities.</li> <li>Authorizes NJDEP to impose seasonal restrictions on dredging activities. (We assume this requirement will be waived.)</li> </ul>	Location Specific
New Jersey Freshwater Wetlands Protection Act Rules	N.J.A.C. 7:7A	<ul> <li>Delineation of existing wetlands will be required during the pre-design phase.</li> <li>Dredging activities may impact these wetlands requiring mitigation.</li> </ul>	Location Specific

Table 2-23d: ARARs for Capping, Backfilling, Armoring and Mudflat Reconstruction

ARAR	Citation(s)	Rationale	Action Specific/ Location Specific
Clean Air Act	42 U.S.C. §§ 7401 et seq.	Covers emissions from equipment.	Action Specific
Clean Water Act (CWA)	33 U.S.C. §§ 1251 et seq.	Covers discharge of fill material.	Action Specific
Endangered Species Act	16 U.S.C. §§ 1531-1544	• Survey will be required during design phase to identify endangered or threatened species or their habitats in the areas impacted by capping activities.	Location Specific
Rivers and Harbors Act	33 U.S.C. §§ 401 et seq.	Applies to barge movement and anchoring.	Location Specific
Federal and State Historic Preservation Acts	16 U.S.C. § 470; N.J.S.A. 13:1B	<ul> <li>Survey will be required during design phase to identify any historic properties or cultural resources which may be impacted by capping activities.</li> </ul>	Location Specific
New Jersey Coastal Zone Management Rules	N.J.A.C. 7:7E	Covers filling in fish habitats or spawning areas.	Location Specific
New Jersey Freshwater Wetlands Protection Act Rules	N.J.A.C. 7:7A	<ul> <li>Delineation of existing wetlands will be required during the design phase.</li> <li>Wetlands may be impacted by capping and backfilling, and by operation and movement of equipment.</li> <li>Mudflats areas may be classified as wetlands.</li> </ul>	Location Specific
New Jersey Stormwater Management Rules	N.J.A.C. 7:8	<ul> <li>Covers activities which affect erosion, groundwater recharge, or runoff quantity and quality.</li> <li>Applies to stockpile runoff.</li> </ul>	Action Specific

Table 2-23e: ARARs for CDF Construction and Operation

ARAR	Citation(s)	Rationale	Action Specific/ Location Specific
Clean Air Act	42 U.S.C. §§ 7401 et seq.	Covers emissions for equipment.	Action Specific
Clean Water Act (CWA)	33 U.S.C. §§ 1251 et seq.	Covers discharge of fill material.	Action Specific
Endangered Species Act	16 U.S.C. §§ 1531-1544	<ul> <li>Survey will be required during design phase to identify endangered or threatened species or their habitats in the areas of the proposed CDF.</li> </ul>	Location Specific
Hazardous Material Transportation Act	49 U.S.C. §§ 5101 et seq.	<ul> <li>Covers transportation of any hazardous wastes.</li> <li>EPA will make the determination on whether or not the dredged sediments qualify as hazardous waste.</li> <li>EPA will determine if the CDF is "on-site," and therefore not subject to transportation rules.</li> </ul>	Action Specific
Resource Conservation and Recovery Act (RCRA)	40 C.F.R. §§ 239 - 299	<ul> <li>Covers transportation and disposal of hazardous wastes.</li> <li>EPA will make the determination on whether or not the dredged sediments qualify as hazardous waste.</li> </ul>	Action Specific
Rivers and Harbors Act	33 U.S.C. §§ 401 et seq.	<ul> <li>Applies to barge movement and anchoring.</li> <li>Applies to construction and use of off-loading docks, etc.</li> </ul>	Location Specific
Toxic Substances Control Act (TSCA)	15 U.S.C. §§ 2601 et seq.	<ul> <li>Governs transportation, handling and storage of PCB-contaminated waste with concentrations greater than 50 ppm.</li> <li>Thus far, chemical analysis of river sediments has not exhibited samples above the TSCA limit. However, if the results of the sampling effort show concentrations over the limit, TSCA may apply.</li> </ul>	Action Specific
Federal and State Historic Preservation Acts	16 U.S.C. § 470; N.J.S.A. 13:1B	<ul> <li>Survey will be required during design phase to identify any historic properties or cultural resources which may be impacted CDF construction or operation.</li> </ul>	Location Specific
New Jersey Air Quality Regulations	N.J.A.C. 7:27	Applicable if volatile contaminants in the dredged material are likely to affect air quality.	Action Specific
New Jersey Coastal Zone Management Rules	N.J.A.C. 7:7E	• Covers working in fish habitats or spawning areas.	Location Specific
New Jersey Freshwater Wetlands Protection Act Rules	N.J.A.C. 7:7A	Delineation of any existing wetlands in the area of the proposed CDF will be required during the design phase.	Location Specific
New Jersey Stormwater Management Rules	N.J.A.C. 7:8	<ul> <li>Covers activities which affect erosion, groundwater recharge, or runoff quantity and quality.</li> <li>Applies to changes in runoff characteristics once the CDF is closed.</li> </ul>	Action Specific

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Table 2-23f: ARARs for Onsite Thermal Treatment

ARAR	Citation(s)	Rationale	Action Specific/ Location Specific
Clean Air Act	42 U.S.C. §§ 7401 et seq.	<ul> <li>Covers emissions from equipment.</li> <li>Covers emissions from operations of treatment system.</li> </ul>	Action Specific
Endangered Species Act	16 U.S.C. §§ 1531-1544	• Survey will be required during design phase to identify any endangered or threatened species or their habitats in the areas of the proposed thermal treatment facility.	Location Specific
Hazardous Material Transportation Act	49 U.S.C. §§ 5101 et seq.	<ul> <li>Covers transportation of any hazardous wastes.</li> <li>EPA will make the determination on whether or not the dredged sediments qualify as hazardous waste.</li> <li>EPA will determine if the CDF is "on-site," and therefore not subject to transportation rules.</li> </ul>	Action Specific
Resource Conservation and Recovery Act (RCRA)	40 C.F.R. §§ 239 - 299	<ul> <li>Covers treatment, storage, and disposal of potentially hazardous waste.</li> <li>Specifies destruction and removal efficiencies (DRE) limits for the process.</li> </ul>	Action Specific
Rivers and Harbors Act	33 U.S.C. §§ 401 et seq.	<ul> <li>Applies to construction and use of off-loading docks, etc., if not contiguous with CDF.</li> </ul>	Location Specific
Federal and State Historic Preservation Acts	16 U.S.C. § 470; N.J.S.A. 13:1B	<ul> <li>Survey will be required during design phase to identify any historic properties or cultural resources which may be impacted by the proposed thermal treatment facility.</li> </ul>	Location Specific
New Jersey Air Quality Regulations	N.J.A.C. 7:27	<ul> <li>Applicable to emissions from the facility during operation.</li> <li>Also covers emissions from construction equipment.</li> </ul>	Action Specific
New Jersey Coastal Zone Management Rules	N.J.A.C. 7:7E	<ul> <li>Covers working and transporting across coastal zone from CDF to thermal treatment location.</li> </ul>	Location Specific
New Jersey Freshwater Wetlands Protection Act Rules	N.J.A.C. 7:7A	Delineation of any existing wetlands in the area of the proposed thermal treatment facility will be required during the design phase.	Location Specific
New Jersey Soil Erosion and Sediment Control Act	N.J.S.A. 4:24-39 to 55	<ul> <li>Requires the development of a sediment control plan for any development or construction activities.</li> </ul>	Location Specific
New Jersey Stormwater Management Rules	N.J.A.C. 7:8	<ul> <li>Covers activities which affect erosion, groundwater recharge, or runoff quantity and quality.</li> <li>Applies to changes in runoff characteristics caused by construction of the facility.</li> </ul>	Action Specific

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Table 2-23g: ARARs for Wastewater Treatment and Discharge

ARAR	Citation(s)	Rationale	Action Specific/ Location Specific
Clean Air Act	42 U.S.C. §§ 7401 et seq.	<ul> <li>Covers emissions from equipment.</li> <li>Covers emissions from operations of treatment system.</li> </ul>	Action Specific
Endangered Species Act	16 U.S.C. §§ 1531-1544	<ul> <li>Survey will be required during design phase to identify endangered or threatened species or their habitats in the areas of a proposed wastewater treatment facility.</li> <li>The survey will also indicate potential impacts on threatened or endangered species from discharge of effluent.</li> </ul>	Location Specific
General Pretreatment Regulations for Existing and New Sources of Pollution	40 C.F.R. § 403	Sets regulations on contaminant concentrations for waters to be treated at a publicly owned treatment works (POTW).	Action Specific
Federal and State Effluent Standards	N.J.A.C. 7:14A; 33 U.S.C. §§ 1251 et seq.	Sets contaminant concentration limits for effluent from a wastewater treatment plant.	Action Specific
Federal and State Historic Preservation Acts	16 U.S.C. § 470; N.J.S.A. 13:1B	<ul> <li>Survey will be required during design phase to identify historic properties or cultural resources which may be impacted by a proposed wastewater treatment facility.</li> <li>The survey will also show possible impacts of effluent discharge on historic or cultural resources.</li> </ul>	Location Specific
New Jersey Air Quality Regulations	N.J.A.C. 7:27	<ul> <li>Applicable to emissions from the facility during operation.</li> <li>Also covers emissions from construction equipment.</li> </ul>	Action Specific
New Jersey Coastal Zone Management rules	N.J.A.C. 7:7E	Covers working and building in the coastal zone.	Location Specific
New Jersey Freshwater Wetlands Protection Act Rules	N.J.A.C. 7:7A	<ul> <li>Delineation of existing wetlands in the area of any proposed wastewater treatment facility will be required during the design phase.</li> <li>Impacts of a discharge of treated water on nearby wetlands areas will also be considered in the design phase.</li> </ul>	Location Specific
New Jersey Soil Erosion and Sediment Control Act	N.J.S.A. 4:24-39 to 55	Requires the development of a sediment control plan for any development or construction activities.	Location Specific
New Jersey Stormwater Management Rules	N.J.A.C. 7:8	<ul> <li>Covers activities which affect erosion, groundwater recharge, or runoff quantity and quality.</li> <li>Applies to changes in runoff characteristics caused by construction of a facility.</li> </ul>	Action Specific

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